

What is claimed is:

1 1. A method of sampling communication signals within a mobile
2 satellite payload having a phase array antenna, receive radiating elements, a
3 plurality of low noise amplifiers (LNAs) and a plurality of analog-to-digital (A/D)
4 converters, comprising:

5 receiving the communication signals with the receive radiating elements
6 and forming received signals;
7 amplifying said received signals within the plurality of LNAs; and
8 transforming said received signals into digital baseband signals within the
9 plurality of A/D converters.

1 2. A method as in claim 1 wherein transforming the received signals
2 further comprises filtering the received signals within the plurality of A/D
3 converters.

1 3. A method as in claim 1 wherein transforming said received signals
2 comprises sampling the received signals at properly predetermined sampling rates.

1 4. A method as in claim 1 wherein transforming said received signals
2 comprises maintaining the accuracy of said plurality of A/D converters aperture
3 times (α).

1 5. A method as in claim 1 wherein transforming said received signals
2 further comprises sampling the received signals at a predetermined sampling
3 frequency f_s using an A/D converter with an aperture time of $1/A \cdot f_s$.

1 6. A method as in claim 1 wherein transforming the received signals
2 comprises sampling the received signals at frequencies selected from the following
3 group: SHF, KU, EHF, L-band, S-band, and C-band.

1 7. A method as in claim 1 wherein transforming said received signals
2 comprises automatically filtering said received signals within the plurality of A/D
3 converters.

4 8. A method as in claim 1 wherein transforming said received signals
5 incorporates downconverting said received signals within the A/D converter.

6 9. A mobile satellite payload comprising:
7 a phase array antenna, wherein said phase array antenna comprises a
8 plurality of receive radiating elements;
9 a plurality of low noise amplifiers (LNAs) electrically coupled to said
10 receive radiating elements; and
11 a plurality of analog-to-digital (A/D) converters electrically coupled to said
12 LNAs, wherein said plurality of A/D converters transform received signals into
13 digital baseband signals.

14 10. A system as in claim 9 wherein said plurality of A/D converters
15 incorporate the function of a downconverter.

16 11. A system as in claim 9 wherein said plurality of A/D converters
17 incorporate the function of a filter.

18 12. A system as in claim 9 wherein said plurality of A/D converters
19 operates with various aperture times.

20 13. A system as in claim 9 wherein said plurality of A/D converters are
21 able to perform as low pass or band pass filters.

22 14. A system as in claim 9 wherein said plurality of A/D converters are
23 able to sample at different predetermined sampling rates.

1 15. A communication system comprising:

2 an antenna;
3 a low noise amplifier (LNA) electrically coupled to said antenna; and
4 an analog-to-digital (A/D) converter electrically coupled to said LNA,
5 wherein said A/D converter transforms a received signal into a digital baseband
6 signal.

7 16. A method of sampling communication signals within a mobile
8 satellite payload having a phase array antenna, receive radiating elements, a
9 plurality of low noise amplifiers (LNAs) and a plurality of analog-to-digital (A/D)
10 converters, comprising:

11 receiving the communication signals through the use of the receive
12 radiating elements and forming received signals;

13 amplifying said received signals within the plurality of LNAs;

14 downconverting said received signals within the plurality of A/D
15 converters;

16 sampling said received signals within the plurality of A/D converters;

17 filtering said received signals within the plurality of A/D converters;

18 wherein the combination of downconverting, sampling, and filtering said
19 received signals transforms said received signals into digital baseband signals.

1 17. A method as in claim 16 wherein sampling said received signals
2 comprises maintaining the accuracy of said plurality of A/D converters aperture
3 times (α).

4 18. A method as in claim 16 wherein sampling said received signals
5 comprises sampling the received signals at properly predetermined sampling rates.

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